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## Impact of Education on Provider Knowledge and Screening Practices Related to Childhood Obesity

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Impact of Education on Provider Knowledge and Screening Practices Related to Childhood  
Obesity

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Spring 2018

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## **Abstract**

PURPOSE: The purpose of this study was to evaluate the effect of a provider education program on BMI screening practices and provider knowledge related to childhood obesity by implementing an educational intervention to advanced practice providers in a primary care clinic setting.

METHODS: A pretest/posttest design was used to examine changes in provider knowledge about BMI screening practices in children and adolescents, and lifestyle recommendations after a brief educational intervention was provided. A retrospective chart review was used to assess the screening and management practices for an elevated BMI percentile and provider documentation of lifestyle recommendations.

RESULTS: A total of 63 charts in the overweight and obese categories were reviewed for children ages 6-18 who presented for a well child visit from June 2017-March 2018. The sample consisted of 57% female, 63% Caucasian, 33% African American, and <1% Asian and unknown with a BMI percentile ranging from the 85<sup>th</sup>-99<sup>th</sup> percentile. Of the 24 participants who met criteria for overweight (BMI between the 85<sup>th</sup>-94<sup>th</sup> percentile), none had a diagnosis of overweight, 79% had a discussion of lifestyle recommendations, and only 8% had specific counseling (including a specific discussion of weight status and potential next steps in treatment or referral at next visit) or labs that were being ordered or monitored. Of the 39 who met criteria for obesity, 41% had a diagnosis of either overweight or obese, 7.6% were referred for further treatment and management, 15% had specific counseling or labs ordered or monitored, and 87% had lifestyle recommendations documented.

Pre/post-survey results showed an increase in the knowledge-based questions about BMI screening and management after the education session; specifically, the age at which screening should begin, what is considered a healthy weight, and physical activity recommendations.



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CONCLUSION: Childhood overweight and obesity is a complex problem that requires the collaboration of healthcare providers, schools, communities, and parents working to create a healthier generation. This study identified several areas the clinic can improve related to their BMI screening practices and management of pediatric patients who are overweight or obese. This study identified that patients have a BMI percentile calculated, but providers are not identifying and diagnosing these patients correctly. It was also identified that a very low percentage of patients are having labs monitored or being referred to the pediatric BMI clinic. Improving the BMI screening process, and provider compliance with diagnosing, referring patients to receive further treatment, and providing lifestyle counseling are important next steps to improve this process in the clinic.

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## Impact of Education on Provider Knowledge and Screening Practices Related to Childhood Obesity

### Introduction

The increase in obesity among children and adolescents in the United States is a major concern. The prevalence of overweight and obesity has been on the rise since 1980; however, there was a spike in the prevalence between 2000-2005. As of 2014, an estimated 12.7 million children and adolescents are obese (Centers for Disease Control and Prevention [CDC], 2017<sup>1</sup>). Eating foods higher in calories and sugar in addition to being less physically active are some causes of the increase in overweight and obese children and adolescents over the last 30 years. (CDC, 2017<sup>2</sup>). Childhood obesity causes immediate health effects such as high blood pressure, high cholesterol, sleep apnea, type 2 diabetes, and joint issues for children, and they are more likely to become obese adults (CDC, 2017). There are serious health concerns that obese children and adults are more at risk for, and with these health issues comes a financial burden as well.

The organization Healthy People 2020 found that as of 2008, only 49.7% of primary care providers (PCPs) regularly assessed BMI according to the age and sex of their pediatric patients (Healthy People 2020). A study by Klein et al. (2010) reported a slight increase in the screening rate. With 52% of clinicians who reported assessing BMI percentile in children over two years of age. The Healthy People 2020 goal is to increase this number to 54.7% by 2020. Once a child or adolescent has been identified as overweight or obese, only a small percentage of them are receive counseling and education about nutrition and diet. Healthy People 2020 reports that in 2007, only 12.2% of adult and child office visits included counseling about nutrition or

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diet. Klein et al. (2010) found that 89% of providers reported discussing diet, 86% discussed physical activity, and 76% discussed screen time. Eighty-nine percent of providers reporting discussing diet at visits is a drastic increase from the Healthy People 2020 statistic, which also included adult visits. The Healthy People 2020 goal is to increase the percentage of counseling to 15% by 2020. This project seeks to examine changes in provider knowledge about BMI screening and lifestyle recommendations, as well as provider compliance with BMI screening.

### **Background and Literature Review**

Childhood obesity has more than doubled in children and quadrupled in adolescents in the U.S. in the past 30 years (CDC, 2017). The percentage of children aged 6-11 with obesity increased from 7% in 1980 to nearly 18% in 2012. The percentage of adolescents aged 12-19 with obesity increased from 5% to nearly 21% during the same period (CDC, 2017). A normal BMI in children is considered a BMI between the 5<sup>th</sup>-84<sup>th</sup> percentile, overweight is considered a BMI between the 85<sup>th</sup>-94<sup>th</sup> percentile, and obesity is a BMI greater than the 95<sup>th</sup> percentile (CDC, 2017). The US Preventative Services Task Force recommends screening all children and adolescents aged 6 and older for obesity (USPSTF, 2017). The American Academy of Pediatrics endorses these recommendations but further recommend plotting a BMI on children two years and older annually (AAP, 2015). It is also recommended that overweight patients with risk factors have a lipid panel ordered, and obese patients should have a fasting lipid panel, fasting glucose, and AST/ALT to monitor for co-morbidities (AAP, 2015).

Childhood overweight and obesity have both immediate and long-term health effects. Some of the health effects overweight and obese children can suffer from include high cholesterol, high blood pressure, pre-diabetes, sleep apnea, bone and joint problems, and

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social and psychological problems. In a population-based sample of 5- to 17-year-olds, 70% of obese youth had at least one risk factor for cardiovascular disease (CDC, 2017). Risk factors for cardiovascular disease include a family history, high blood pressure, hyperlipidemia, or pre-diabetes. In addition, children and adolescents who are obese are more likely to be obese as adults, and are more at risk for adult health problems related to obesity (CDC, 2017). Some of these obesity-related diseases include heart disease, type 2 diabetes, stroke, several types of cancer, and osteoarthritis (CDC, 2017).

Not only does obesity have negative health effects on the individual, it also costs the United States an estimated \$190.2 billion each year, nearly 21% of the country's annual medical spending (National League of Cities [NLC], 2012). The lifetime medical cost estimate of an obese 10-year-old is \$19,000 more than a normal weight 10-year-old. When you multiply this by the number of obese 10-year-olds, this generates a total direct medical cost of \$14 billion for this age alone (Finkelstein, Graham, Malhotra, 2014). These expenses are expected to grow as today's obese children and adolescents reach adulthood. According to Finkelstein et al. (2012), if obesity rates were to remain at 2010 levels, the projected savings for all medical expenditures would be \$549.5 billion by 2030.

Several factors have contributed to the increase in childhood obesity. Children have much different lifestyles than they did 30 years ago. Children are not as active, families eat fewer home-cooked meals, portion sizes are much larger, and high calorie snacking between meals has increased (White House Task Force on Childhood Obesity [WHTFCO], 2010). There have also been increases in the consumption of sugar-sweetened beverages and screen time as

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well as a decrease in safe environments for children to be active in including safe neighborhoods, parks, and sidewalks used to walk to school (Sahoo et al., 2014).

The literature supports The Endocrine Society's Guideline on the assessment, treatment and prevention of pediatric obesity. Both the literature and The Endocrine Society support that the most effective interventions for addressing overweight and obesity encompass the home, school, and community environments and focus on the main principles of healthier eating, increased physical activity, and reduced screen time (Nigg et al., 2016; Styne et al., 2017; Vine, Hargreaves, Briefel, & Orfeld, 2013). Although the methods of delivery varied from study to study, interventions in these domains were shown to improve physical activity, nutrition, and knowledge of nutrition among pediatric patients and their parents (Nigg et al., 2016).

Healthcare providers can contribute efforts to decrease overweight and obesity by following recommendations from existing programs. One program that has been proven to be very effective is Maine's program, Let's Go! which is an obesity prevention initiative that works with communities to create environments that support healthy choices (MaineHealth, 2018). The Let's Go! program implements evidence-based strategies in schools, child care, out-of-school programs, health care practices and workplaces. This program's primary message is their 5-2-1-0 healthy habits message. This message encourages children and adolescents to eat 5 or more fruits or vegetables daily, 2 hours or less of recreational screen time, 1 hour or more of physical activity, and 0 sugar-sweetened beverages daily. The Let's Go program encourages health care providers to prescribe activity and healthy habits, and includes a guide that providers can use to talk with families.

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When clinicians were provided with resources from this program, including screening algorithms, “prescription for good health” prescription pads, and BMI charts, there were increases in screening rates, documentation of weight classification, and the rates of counseling (Polacek et al., 2009). Kentucky adopted the 5-2-1-0 campaign for parents, healthcare providers, medical offices, childcare providers, and communities to help reduce childhood obesity based on Maine’s Let’s Go! Program and its success (Bolling, Guthier, & Hawkins, 2015). Kentucky provides informative brochures to educate families with as well as posters for offices and “prescription for good health” prescription pads to be used by providers.

Primary care providers play an important role in assessing and diagnosing childhood obesity, and providing counseling and resources to families. The literature demonstrates that the interventions are effective and by encouraging healthy behavior changes that include parents, the school environment, clinicians, and the community, children are more likely to be healthy.

There are numerous educational programs and resources available, but in order for these programs and interventions to work, screening for childhood overweight and obesity must be done. By screening children and correctly identifying patients who are overweight and obese, and then implementing these recommendations we can improve the childhood obesity problem facing the United States.

### **Purpose**

The U.S. Preventative Services Task Force (USPSTF) recommends that healthcare providers screen for obesity in children and adolescents 6 years and older and offer or refer

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them to comprehensive, intensive behavioral interventions to promote improvements in weight status (USPSTF, 2017). The purpose of this study was to evaluate the effect of a provider education program on BMI screening practices and provider knowledge related to childhood obesity for advanced practice providers in a primary care clinic setting. This study took place at a family practice clinic which is part of an academic medical center.

The specific aims of this project are to:

1. Assess baseline provider knowledge about BMI screening and lifestyle recommendations and the current BMI screening practices and weight management of overweight and obese patients in the primary care clinic.
2. Evaluate the impact of provider education on provider knowledge about BMI screening practices and lifestyle recommendations.

## Methods

### Setting

This study was conducted at a large primary care clinic in Kentucky. This clinic is part of an academic medical center and has 27 physicians and eight advanced practice providers who treat a variety of patients including children and adults.

### Design

A retrospective chart review was used to assess the screening and management practices for an elevated BMI percentile and provider documentation of lifestyle recommendations. A prospective pretest posttest design using provider surveys was used to

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examine changes in provider knowledge about BMI screening practices in children and adolescents, and lifestyle recommendations. After the education intervention, a focus group was held with advanced practice providers (APP) that attended the session.

### **Subject Recruitment**

Children and adolescents ages 6-18 who were seen for a well-child exam were the targeted population. Inclusion criteria included the presence of overweight or obesity, ages of six-18 years of age at the time of well child visit, and a well child visit between June 2017-March 2018. A report identified a total of 253 patients ages 5-19 who were seen for a well child visit between June 2017-March 2018. The medical record was reviewed to determine if they met inclusion criteria. Patients met inclusion criteria if they were between the age of six-18 years of age at the time of the well child visit, they had a well child visit between June 2017-March 2018, and if they had a BMI percentile in the overweight (BMI between 85<sup>th</sup>-94<sup>th</sup> percentile) or obese (BMI >95<sup>th</sup> percentile) category.

The advanced practice providers received an email inviting them to participate in a survey prior to the education intervention. Each provider was asked to participate in a brief survey to assess their baseline knowledge that included 18 questions assessing knowledge about BMI, potential barriers, and lifestyle recommendations. Participants had one week to complete the survey through REDCap, a secure online web based survey tool.

The eight APPs were invited via email to attend an education session about BMI screening and participate in a focus group during their lunchtime. The providers that attended



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the education session were emailed a post-intervention survey via REDCap to assess for a change in knowledge about BMI.

### **Sample and Data Collection**

Of the 253 patients identified from the report of well child checks, there were 146 patients with normal weight, 44 overweight patients, 61 obese patients, and two without a BMI calculated. Of those patients, 24 overweight patients met inclusion criteria, and 39 obese patients met inclusion criteria. The medical record note was reviewed for: the presence of diagnosis for overweight if the BMI was in the 85<sup>th</sup>-94<sup>th</sup> percentile or obesity if the BMI was >95<sup>th</sup> percentile, the assessment and initiation of labs, a referral, or specific counseling regarding weight status, demographics, and documentation of lifestyle recommendations including diet, physical activity, and screen time. The data collection began after obtaining IRB approval from the University of Kentucky review board. Four providers completed the pre-intervention survey and seven attended the education session. Two providers completed the post-intervention survey (see Appendix A for more information about the survey).

### **Research Procedures**

The medical record review took place in a private room at the clinic. The medical records were screened to determine if they met inclusion criteria, data were then de-identified. The medical record number of each patient who met study criteria was linked to a unique study number on an electronic spread sheet. A crosswalk table was developed with the patient's unique study number linked to the medical record number. The de-identified spreadsheet was stored on a password protected computer.

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Seven APPs attended the educational session during their lunchtime. The educational intervention involved a brief education session where a PowerPoint was presented discussing BMI screening recommendations and the results of the chart audits (see Appendix B for more information on the BMI presentation). Resources including 5-2-1-0 posters, “prescription for good health” prescription pads, and brochures for families from the KY 5-2-1-0 initiative were provided to be used to educate patients and parents during the well child visits. After the education session, providers participated in a focus group to discuss barriers to screening and weight management and potential next steps to improve the management on childhood overweight and obesity. The APPs that attended the education session were sent an invitation to complete a post-education survey via REDCap.

### Data Analysis

Each participant in the survey self-reported qualitative and quantitative answers based on a survey in REDCap, these were then recorded in an Excel spreadsheet. Descriptive statistics were used to summarize data counts and percent for the chart audits.

## Results

### Sample Characteristics

**BMI screening.** For the chart audit, 24 charts met inclusion criteria with a BMI range between the 85<sup>th</sup>-94<sup>th</sup> percentile, the overweight category. The demographics and audit results are as follows: N=24

- 79% male, 21% female
- 63% Caucasian, 37% African American

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- Age range: 8-18 years
- Mean age: 13.6 years
- 75% in the 90<sup>th</sup>-94<sup>th</sup> percentile
- Zero had a diagnosis of overweight
- 8% had labs that were ordered or being monitored related to their weight status.
- 79% had lifestyle recommendations in the discussion section of the chart.

There were 39 charts that met inclusion criteria in the obese category which is a BMI >95<sup>th</sup> percentile. All of these charts were reviewed. The demographics and results are as follows: N=39

- 44% male, 56% female
- 64% Caucasian, 31% African American, 2.5% Asian, and 2.5% unknown ethnicity
- Age range: 7-18 years
- Mean age: 12.8 years
- 56% with BMI in 99<sup>th</sup> percentile
- 41% with diagnosis of overweight or obesity
- 7.6% referred to the BMI clinic
- 15% had labs that were ordered or being monitored related to their weight status
- 87% had lifestyle recommendations in the discussion section of the chart.

**Provider knowledge.** Four advanced practice providers completed the pre-survey through REDCap. The survey included questions related to childhood overweight and obesity as well as questions to assess their attitudes and current practice for BMI screening and management.

The findings of the survey are as follows in Table 1:

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Table 1. Survey Responses

Questions (Answers)	Pre-education %	Post-education %	
Have you ever had any formal training related to pediatric obesity or BMI screening? <b>Yes</b>	25%		
What diseases are overweight/obese children at risk for? <i>Select all that apply</i> <b>a. High cholesterol</b> <b>b. Sleep apnea</b> <b>c. Bone/joint problems</b> <b>d. Hypertension</b> <b>e. Pre-diabetes</b> <b>f. Social issues</b>	<b>a:100%</b> <b>b:100%</b> <b>c:100%</b> <b>d:100%</b> <b>e:100%</b> <b>f:100%</b>	<b>a:100%</b> <b>b:100%</b> <b>c:100%</b> <b>d:100%</b> <b>e:100%</b> <b>f:100%</b>	
At what age should clinicians begin screening children/adolescents for obesity by obtaining BMI? a. 2 years b. 4 years <b>c. 6 years</b> d. 10 years	a: 25% b: 50% <b>c:25%</b> d:0%	a:0% b:0% <b>c:100%</b> d:0%	
A healthy weight is considered a BMI: a. 5-70 <sup>th</sup> percentile b. 5-75 <sup>th</sup> percentile <b>c. 5-84<sup>th</sup> percentile</b>	a:0% b:50% <b>c:50%</b>	a:0% b:0% <b>c:100%</b>	
Overweight is defined as an age- and gender- specific BMI between: a. 75 <sup>th</sup> -80 <sup>th</sup> percentile	a:0%	a:0%	

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<b>b. 85<sup>th</sup>-95<sup>th</sup> percentile</b> c. >90 <sup>th</sup> percentile	<b>b:100%</b> c: 0%	<b>b:100%</b> c: 0%	
Obesity is defined as an age- and gender-specific BMI: a. >80 <sup>th</sup> percentile <b>b. &gt;95<sup>th</sup> percentile</b> c. >90 <sup>th</sup> percentile	a:0% <b>b:100%</b> c: 0%	a:0% <b>b:100%</b> c: 0%	
Do you have a referral resource for children in your community identified as overweight or obese? <b>Yes/No</b>	Yes: 50%	Yes: 100%	
How much physical activity is recommended for children/adolescents daily? a. 30 minutes b. 45 minutes <b>c. 60 minutes</b> d. 2 hours	a:25% b: 25% <b>c: 50%</b> d: 0%	a:0% b: 0% <b>c: 100%</b> d: 0%	
<b>Attitudes:</b>			
When you give educational materials regarding weight status which of the following best describes what you use? Check all that apply. a. Paper handouts b. Verbal education while in office c. Verbal education and handouts d. Other	a:0% b: 75% c: 0% d: 25%	a:0% b: 100% c: 0% d: 0%	
If anything, what prevents you from screening/providing education regarding weight management (for example, diet and exercise recommendations)? a. Time b. Knowledge deficit	a. 50% b. 50% c. 25% d. 50%	a. 100% b. 0% c. 0% d. 0%	

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c. Lack of referral resources d. Other			
During well child visits how often do you provide weight management education (exercise and diet recommendations)? a. Every well child visit b. Majority of well child visits c. Rarely d. Never	a. 50% b. 50%	a. 50% b. 50%	
How often do you refer patients identified as overweight or obese for comorbidity screening (for example, lab tests)? a. Every patient b. Rarely c. Occasionally d. Never	a. 0% b. 25% c. 75% d. 0%	a. 0% b. 0% c. 100% d. 0%	
During a typical week, how many pediatric patients do you personally see and treat? Your best guess is fine.	0-3 patients/week		
Do you think you could benefit from educational materials regarding the appropriate screening for pediatric overweight or obesity issues? <b>Yes/No</b>	Yes: 100%	Yes: 100%	
Do you feel like you have a sufficient amount of resources within your practice and in the community to manage/treat a PEDIATRIC patient identified as overweight or obese?	Yes: 75%	Yes: 50%	

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Yes/No			
Do you feel that the educational session was helpful? Yes/No		100%	
Feedback/suggestions for improvement of education:		"Thanks for the handouts. I feel these will be helpful in my practice." "I enjoyed the session and liked the handouts."	

### Discussion

This study identified opportunities to improve the current rate of identifying, diagnosing, and managing patients with an elevated BMI. For the patients in the overweight category, none had a diagnosis in the overweight category, and only 79% had lifestyle recommendations documented. The recommendation is that these patients be diagnosed as overweight, prevention counseling discussed, and potentially have labs ordered depending on if they have risk factors present. This review shows that they are not being diagnosed according to the recommendations, and there is the opportunity to improve documentation of lifestyle recommendations.

For obese patients, it is recommended that they have the diagnosis of obesity, have lifestyle recommendations discussed, and if risk factors are present, labs should be ordered to monitor for co-morbidities. These patients can either be referred to the BMI clinic immediately, or after being monitored for three-six months without a change in their weight or lifestyle habits. This review showed that fewer than half of patients who are obese are being

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diagnosed correctly; only 41% had a diagnosis of either overweight or obesity when it should have been obesity. The referral rate is extremely low at 7.6%, and the percentage of these patients having their labs monitored for co-morbidities is also low at 15%. These patients can be referred to a Pediatric BMI clinic that is affiliated with the clinic.

These findings are consistent with other studies, for example only 43% of overweight and obese patients had documentation of excess weight in their EMR in a study by Higgins, McCarville, Kurowski, McEwen and Tanz (2014). The number of obese patients referred to treatment was also extremely low at 7.6%, which is lower than the reported 18% of providers who refer patients for further evaluation and management (Vine, Hargreaves, Briefel, & Orfield, (2013). The study by Higgins et al. (2014) showed a higher rate of screening tests ordered for these patients at 42% compared to the 8% for the overweight category and 15% in the obese category in this study. Office tools and reminders that support BMI documentation and lifestyle counseling can help improve provider compliance with the recommendations.

On the provider survey, the knowledge-based questions about BMI screening and management showed improvement after the education session, specifically knowing the age screening should begin, and what is considered a healthy weight. Perceptions that knowledge deficit was a barrier to providing counseling to patients was eliminated after the education session, going from 50% of providers feeling that it was a barrier to 0% after the education session. Fifty percent of providers identified time as a barrier prior to the education session and 100% after the intervention. This could be due to the lower number of providers that completed the post-test, n=2 compared to n=4 in the pre-test, or because providers realized the



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screening recommendations and discussion with families and felt as though time was more of a factor after learning this information.

Providers participated in a focus group after the education session and identified several barriers to screening and managing overweight and obese patients. Parents were identified as a barrier to managing overweight and obese patients. Providers stated that parents would sometimes get upset or angry if they identified their child as overweight or obese, and would often resist the provider's recommendations. They believe many parents do not understand the serious risks of being overweight or obese.

They also reported that many patients do not complete the recommended follow-ups for weight management. They stated that many parents found it difficult to take time away from work and to take children out of school early in order to keep their appointments; parents did not think it was "worth it." When referring patients to the pediatric BMI clinic, parents have to be involved in the process and they are "usually" resistant to participating in the program, according to the providers. Providers also had questions and concerns about insurance coverage for the pediatric BMI clinic. They stated that they did not think some insurance plans would cover their services and did not want the patients to receive bills they were unable to pay.

They also expressed concern about addressing children and adolescents' weight in a way that would not hurt their feelings or make them think they were calling them "fat." They stated children who are overweight or obese often have a difficult time in school socially or with bullying, and expressed concern addressing their weight status. They were concerned that

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the discussion of weight status would be received negatively and could hurt their self image or self-esteem. The providers liked the idea of the “prescription for health” pads that can be utilized for well child checks, as well as the 5-2-1-0 brochures to give the patients and families.

When discussing future studies and ways to improve, the providers discussed having more education for parents that discussed risks and the importance of their children being a healthy weight since they felt as though the parents do not understand how important it is. They also discussed having more programs and consistency in the school systems. One provider expressed concern that one school in the county had healthy options in vending machines and no sugar-sweetened beverages; however, on the other side of town the school had candy and chips in the vending machines as well as sugar-sweetened beverages. They stated most children eat breakfast and lunch at school so it was important that they receive healthy food options and physical activity while at school. They also thought it would be a good idea to have homework or activities related to nutrition and exercise that parents could help them with so they would learn about it as well.

The focus group and survey identified lack of time, knowledge deficits, feeling uncomfortable addressing the weight status of the child, and being unfamiliar with the pediatric BMI clinic as barriers to following the recommendations for treating and managing overweight and obese patients. These findings are consistent with the literature. Klein et al. (2010) found pediatric providers reported training, time, and resource limitations affected BMI-percentile use. A study by Vine Hargreaves, Briefel, and Orfield (2013) discusses a number of obstacles that primary care providers face that limit their ability to follow the recommendations. Lack of office time, lack of comfort or skill counseling families on the issue,

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lack of awareness of the issue, and lack of familiarity and availability of community resources for lifestyle counseling and prevention programs are all barriers identified in the literature, which is consistent with the findings of the survey and focus group (Vine, Hargreaves, Briefel, Orfield, (2013).

### **Limitations**

There were several limitations to this study, one is the small sample size and the intervention group. Out of the eight providers, only four completed the pre-survey, and two completed the post-survey. There was a limited amount of time to complete the study due to a delay in receiving data for the chart audits. It took time for the clinic's IT department to retrieve the data needed in this study, patients seen for a well child visit from June 2017-March 2018. There was also difficulty coordinating the schedules of providers to determine a day where the majority of the providers could participate in the education session which resulted in a delay in scheduling the education session which prevented the post-education review of charts. Another limitation is the possibility of medical records being overlooked due to them being mislabeled. Each medical record note was reviewed by the primary investigator and there were several notes mislabeled as a primary care visit or acute visit instead of being labeled as a well child visit. If the medical record note was mislabeled, the visit could have been overlooked and not included in the study.

### **Practice Implications**

BMI screening and managing overweight and obese pediatric patients is an important aspect of providing quality care. Primary care providers play an important role in preventing

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childhood obesity and reducing the rate of childhood overweight and obesity. Overweight and obese individuals often experience weight stigmatization and bias which contributes to behaviors such as binge eating, social isolation, avoidance of health care services, decreased physical activity, and increased weight gain over time (Pont, Puhl, Cook, Slusser, 2017). Rankin et al., (2016) found that overweight and obese children and adolescents have an increased risk of depression, compromised perceived quality of life, anxiety, self-esteem, and behavioral disorders. They also experience more bullying and teasing. Healthcare providers should practice with nonbiased behavior and language using empathetic and empowering counseling to discuss weight status and encourage a healthy lifestyle (Pont, Puhl, Cook, Slusser, 2017).

There are also financial implications for pediatric BMI screening and weight management. Medicare Access and CHIP Reauthorization Act (MACRA) has created a pay for performance program that focuses on quality of care, value, and accountability in the Primary Care setting (Centers for Medicare & Medicaid Services, 2018). This clinic selected six quality measures to target to improve both the quality of care as well as meet the MACRA requirements. One of the quality measures the clinic chose to focus on was BMI screening and management of overweight and obese children and adolescents. If the clinic does not meet the quality measures for BMI screening and management, they may not meet the requirements to receive reimbursement in the future. The clinic is also a patient-centered medical home accredited facility. The patient-centered medical home (PCMH) is a model of care that puts patients at the forefront of care. Research has shown that PCMH facilities improve quality, the patient experience, and staff satisfaction, while reducing health care costs (NCQA, 2018). The

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BMI screening rate and management of overweight and obesity are important quality markers for the clinic to maintain their PCMH accreditation by providing the best quality of care.

### **Practice Recommendations**

Based on the findings in the chart audit, which identified that most overweight and obese patients did not have an ICD-9 or ICD-10 diagnosis of overweight or obesity, and the low number of patients being referred to the pediatric BMI clinic or having labs monitored according to the guidelines, it is recommend to continue evaluating the screening practices and management of overweight and obese patients to determine if the rate of diagnosis and treatment is increasing after the education. The clinic should also continue efforts to improve the diagnosis and management of overweight and obese patients by implementing a screening protocol for well child visits, and utilize the 5-2-1-0 resources to counsel patients and families. It is critical for providers to identify and diagnose overweight and obese patients so they can receive the treatment and counseling they need to reduce their weight and improve their overall health. Overweight and obese patients must be identified and diagnosed correctly because they also need to be monitored closely for co-morbidities related to their weight status, which includes monitoring their labs (USPSTF, 2017). If providers are not identifying patients as overweight or obese based on their BMI percentile, they will not be receiving the best quality of care, will not receive the treatment they need, and are more likely to become overweight or obese adults and are at risk for a number of future health complications.

Another recommendation is to include an algorithm to treat and manage overweight and obese patients in the patient rooms that would allow providers to easily reference and

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discuss the next steps with patients and families. The clinic should implement a well child visit protocol that should be followed at each well child visit. Perrin, Finkle, & Benjamin (2009) have an example of a plan that is recommended to be used at wellness visits (see Appendix C for this algorithm). Their plan includes a questionnaire for parents to fill out in addition to an algorithm for providers to use. The questionnaire for parents includes questions about their child's current health habits and assessing their readiness to change. The algorithm they recommend includes the assessment of BMI percentile, determining if the patient is a healthy weight, overweight, or obese, and providing the recommended treatment. The algorithm also includes utilizing the parent survey to aide in the discussion of family nutrition, physical activity, and readiness to change. This type of screening protocol would help guide providers through the well child visit, and includes the assessment of BMI percentile, the discussion about weight status, lifestyle recommendations, and assessing their readiness to change. After the screening protocol was implemented, the clinic would be able to monitor the progress they make in correctly identifying, diagnosing, and managing overweight and obese patients.

The provider survey identified a knowledge deficit about screening recommendations and that providers felt that they had the resources available, but a knowledge deficit potentially kept them from managing the patients according to the guidelines. The 5-2-1-0 healthy habit brochures provide information that can be discussed throughout the visit with providers, and patients and families are able to take them with them (Bolling, Guthier, & Hawkins (2015). The "prescription for health" pads are also a good resource that allows providers to "prescribe" healthy habits that patients and families can improve. The clinic should continue to order these

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free health resources from the state and implement the 5-2-1-0 lifestyle recommendations with patients and families (see Appendix D for these resources).

Since providers reported feeling uncomfortable bringing up a child's weight, it would be helpful to provide education to providers regarding different ways to discuss the patient's weight status without upsetting them or making them feel badly. Resnicow et al., (2015) found a decrease in the BMI percentile in patients who received motivational interviewing by providers and dieticians. By learning motivational interviewing techniques regarding healthy lifestyle habits and dietary recommendations, providers can feel more comfortable discussing this sensitive subject with parents and children.

In regards to provider's concerns about insurance coverage and the pediatric BMI clinic, and because 25% of the providers were unaware of the pediatric BMI clinic, the pediatric BMI clinic should give a brief education session to providers. They can discuss what they offer, what the treatment program typically consists of for patients, as well as how insurance coverage works in their clinic. By educating the providers about their services and answering their questions, providers would be able to educate patients and parents more about the treatment options at the clinic. If the patients and parents understood more about what the clinic does and what the treatment programs consist of, they may be more likely to follow through with the referral to the clinic. These recommendations can help the clinic improve to meet their quality measures for pediatric BMI screening and management.

### **Recommendations for Future Studies**

There are several studies that evaluate interventions and their efficacy for preventing and treating obesity; however, in this clinic it would be beneficial to create a study to evaluate patient and parent perspectives about weight status in the clinic. In the focus group providers had several concerns about parents not understanding the seriousness of being overweight and obese, not being compliant with treatment or follow-ups, and having parents get upset when the child's weight is brought up. In order to provide quality care and follow the recommendations for follow-up appointments, counseling, and referring patients for more comprehensive treatment, it is important to understand the perspective of parents in order to approach the sensitive subject of weight status. Parents play an important role in the treatment of overweight and obesity, so it is important to have parental participation in treatment. The results of the future study to assess parent perspectives could be compared to the literature to see if the opinions and perspectives are similar to what is found in the literature. The information gathered in the future study could be tailored specifically to the needs of the clinic to improve the process of discussing weight status with patients and parents.

### **Conclusion**

Childhood overweight and obesity is a complex problem that requires the collaboration of healthcare providers, schools, communities, and parents working to create a healthier generation. This study identified several areas the clinic can improve related to their BMI screening practices and management of overweight and obese children and adolescents. This study identified that patients have a BMI percentile calculated, but providers are not identifying and diagnosing overweight and obese patients correctly. It was also identified that a very low



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percentage of patients are having labs monitored or being referred to the pediatric BMI clinic if they need more comprehensive treatment. Providers play an important role in recognizing these patients and providing them with the treatment they need to reduce childhood overweight and obesity.

An important next step for the clinic is to implement a protocol for well child visits to improve provider compliance of recognizing and diagnosing overweight and obese patients. By following the protocol, providers will manage these patients with evidence-based interventions and counseling, and include lifestyle recommendations in every well child visit. The provider survey identified an improvement provider's knowledge after the education session, and provider's felt that they would be able to use the 5-2-1-0 lifestyle recommendations to educate and counsel their patients. In order to reduce childhood overweight and obesity in the United States, providers must recognize and diagnose overweight and obese patients and provide them with effective interventions and counseling. There are a number of effective programs and interventions to treat overweight and obese patients, but if providers are failing to diagnose them correctly, these programs and interventions will be under-utilized and the rates of childhood overweight and obesity are likely to continue to increase.

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# CHILDHOOD OBESITY

## Appendix A

### Provider Survey

#### Assessing BMI knowledge and BMI screening practices

*Please answer the following questions:*

1. Have you ever had any formal training related to pediatric obesity or BMI screening?  
*Yes/No*

2. What diseases are overweight/obese children at risk for? *Select all that apply*

- g.** High cholesterol
- h.** Sleep apnea
- i.** Bone/joint problems
- j.** Hypertension
- k.** Pre-diabetes
- l.** Social issues

3. At what age should clinicians begin screening children/adolescents for obesity by obtaining BMI?

	2 years		4 years
	6 years		10 years

4. A healthy weight is considered a BMI:

	5-70 <sup>th</sup> percentile		5-84 <sup>th</sup> percentile
	5-75 <sup>th</sup> percentile		

5. Overweight is defined as an age- and gender- specific BMI between:

	75 <sup>th</sup> -80 <sup>th</sup> percentile		65 <sup>th</sup> -75 <sup>th</sup> percentile
	85 <sup>th</sup> -95 <sup>th</sup> percentile		>90 <sup>th</sup> percentile

6 Obesity is defined as an age- and gender-specific BMI:

## CHILDHOOD OBESITY

	$\geq 80^{\text{th}}$ percentile		$\geq 95^{\text{th}}$ percentile
	$\geq 85^{\text{th}}$ percentile		$\geq 90^{\text{th}}$ percentile

7. Do you have a referral resource for children in your community identified as overweight or obese?

Yes/No

8. When you give educational materials regarding weight status which of the following best describes what you use? Check all that apply.

Paper handouts

Verbal education while in office

Verbal education and handouts

Other

9. If anything, what prevents you from screening/providing education regarding weight management (for example, diet and exercise recommendations)?

Time

Knowledge deficit

Lack of referral resources

Other

10. During well child visits how often do you provide weight management education (exercise and diet recommendations)?

Every well child visit

Majority of well child visits

Rarely

Never

11. How often do you refer patients identified as overweight or obese for comorbidity screening (for example, lab tests)?

Every patient

Rarely

Never

Not applicable

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12. During a typical week, how many pediatric patients do you personally see and treat? Your best guess is fine.

\_\_\_\_\_ (# pediatric patients see/treat per week)

13. Do you think you could benefit from educational materials regarding the appropriate screening for pediatric overweight or obesity issues?

No/Yes

14. Do you feel like you have a sufficient amount of resources within your practice and in the community to manage/treat a PEDIATRIC patient identified as overweight or obese?

No/Yes

15. How much physical activity is recommended for children/adolescents daily?

	30 minutes		45 minutes
	1 hour		2 hours

Post survey also included:

16: Did you find the educational interventional helpful?

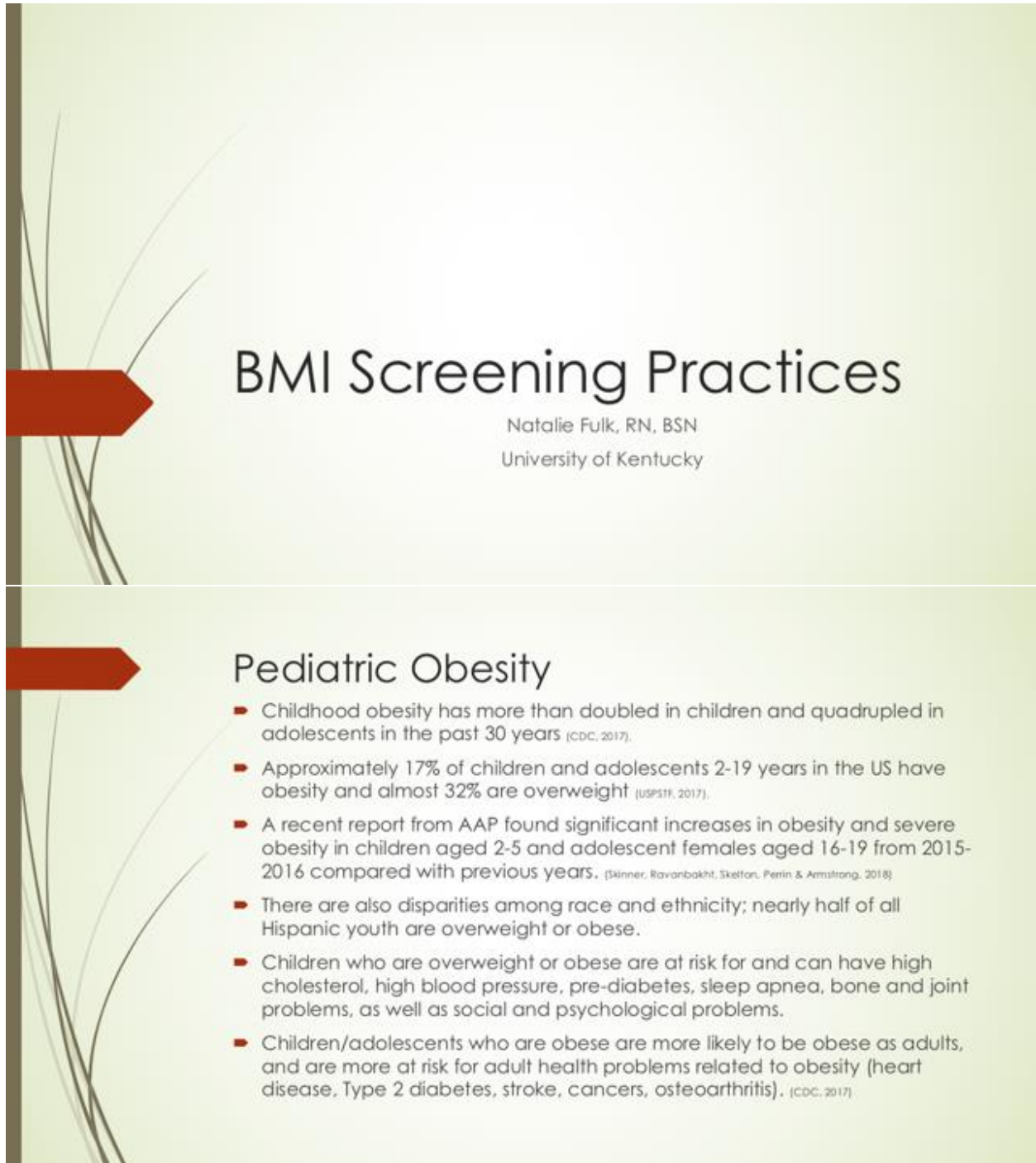
17. Please provide any additional feedback

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Appendix B

BMI PowerPoint Presentation for Provider





### Healthy People 2020

- One of the objectives of HP 2020 is to increase the proportion of PCPs who regularly assess BMI in children and adolescents.
- In 2008, 49.7% of PCPs assessed BMI, the goal for 2020 is to increase to 54.7%.
- Another objective for HP 2020 is to increase the proportion of child or adult visits that include counseling about nutrition or diet.
- 12.2% of office visits included counseling about nutrition in 2007, the goal is to increase to 15.2%.



### BMI Screening

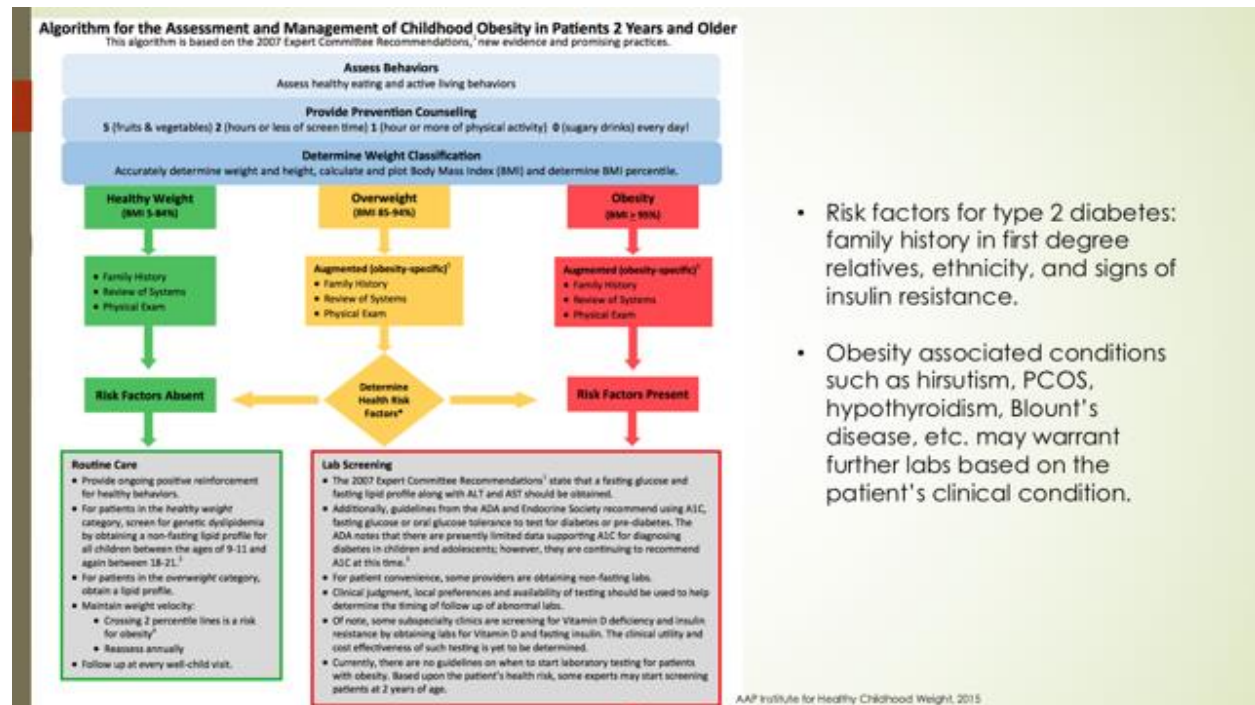
- The US Preventative Services Task Force recommends that clinicians screen for obesity in children and adolescents 6 years and older annually.
- Identifying obesity in children and how to address it are important steps in helping children and families obtain the support they need.

#### BMI for Children and Teens

- Age- and sex-specific
- Plot BMI on growth chart to find percentile
- Weight status determined by percentile

Weight Status Category	Percentile Range
Obese	$\geq 95^{\text{th}}$ percentile
Overweight	85 <sup>th</sup> to < 95 <sup>th</sup> percentile
Normal	5 <sup>th</sup> to < 85 <sup>th</sup> percentile
Underweight	< 5 <sup>th</sup> percentile

# CHILDHOOD OBESITY



## Management and Treatment Stages

- Patients should start at the least intensive stage and advance through the stages based on response to treatment, age, BMI, health risks, and motivation.
- Prevention Plus: Planned follow-up visits focusing on behaviors, consider partnering with dietician, social worker, or athletic trainer.
- Structured weight management: same as stage 1, includes more intense support and structure, follow-up every 2-4 weeks. After 3-6 months consider comprehensive multi-disciplinary intervention.



## Results of chart review

	Number of charts	Diagnosis of overweight/obese?	Referral to BMI clinic	Lifestyle rec. documented in discussion	Counseling/labs documented?
BMI 85-94 <sup>th</sup> percentile (Overweight)	24 charts (55% of sample)	0	0	79%	2(8%)
BMI >95 <sup>th</sup> percentile	39 charts (100% of sample)	16 (41%)	3 (7.6%)	34 (87%)	6 (15%)

## Recommendations

- Identify and diagnose patients who are classified as overweight and obese.
- Provide documentation about specific counseling they received, any labs drawn, and education provided to patients/families. Consider utilizing 5-2-1-0 education resources provided by the state.
- Monitor weight status and refer to BMI clinic if their BMI is >95<sup>th</sup> percentile and other counseling strategies have failed.

## Education

- It is recommended to educate and counsel families on the 5-2-1-0 message.
- KY has this campaign to give parents, healthcare professionals a memorable way to talk about the key behaviors that reduce childhood obesity.
- 5:** eat five or more servings of fruits and vegetables/day
- 2:** limit screen time to no more than two hours/day
- 1:** be physically active at least 1 hour/day
- 0:** zero sweetened beverages.



Kentucky Cabinet for Health and Family Services, (2015)



### HEALTHY NUMBERS FOR KENTUCKY FAMILIES

- Providers should counsel patients and families with this message at each wellness visit. Handouts and "prescriptions for health" can be utilized to help families with compliance and changing behaviors that contribute to overweight and obesity.
- Bright Futures also has handouts for families that provide nutrition and activity information for families.
- Patients whose BMI continues to be in the overweight/obese category without improvement should be referred to a dietician or weight management center.



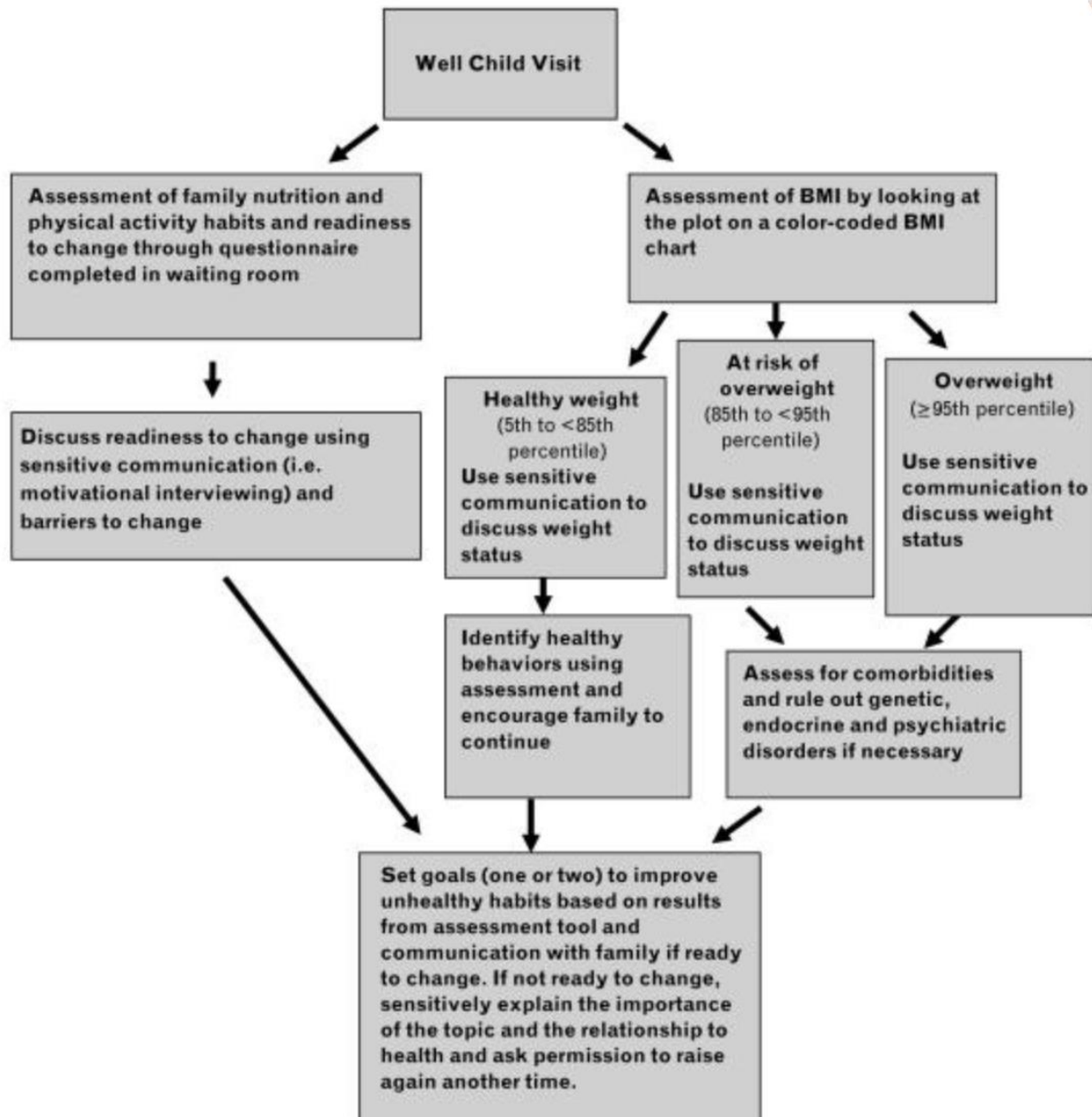


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## Appendix C

Plan for each well child visit



# CHILDHOOD OBESITY

## Appendix D

### KY's 5-2-1-0 Campaign for Health Resources

#### Brochure

**ZERO**  
**ZERO SWEETENED BEVERAGES.**  
Sweet drinks pour on the pounds. Water first.

**KEEP THEM ON THE DOWN-LOW.**  
No other single food or beverage contributes to obesity like sweetened beverages do. This includes soda, sport drinks, pouches, ades and energy drinks.

**SET LIMITS ON JUICE.**  
Though juice contains natural sugar, it has a lot of calories and few nutrients. Dilute it with water. Choose whole fruit over juice.

**KEEP IT HANDY. KEEP IT COLD.**  
Have a pitcher of water in the fridge. Bring reusable water bottles with you wherever you go. Serve water at every meal.

**OUT TO EAT.**  
Choose water at restaurants to save money and calories. If you do get a sweet drink, don't get a refill.

**5-2-1-0**  
HEALTHY NUMBERS FOR KENTUCKY FAMILIES

**Kentucky**  
UNBRIDLED SPIRIT

[www.chfs.ky.gov/5210](http://www.chfs.ky.gov/5210)

**FIVE OR MORE FRUITS & VEGETABLES EVERY DAY**

**TWO OR LESS HOURS OF SCREEN TIME**

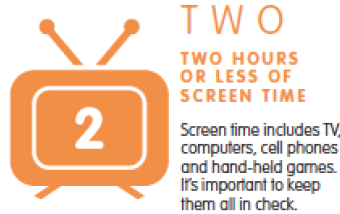
**ONE HOUR OR MORE OF PHYSICAL ACTIVITY**

**ZERO SUGARY DRINKS**

**5-2-1-0**  
HEALTHY NUMBERS FOR KENTUCKY FAMILIES

Adapted from materials developed by Let's Go!  
[www.lets-go.org](http://www.lets-go.org)

# CHILDHOOD OBESITY



## THE ORIGINAL FAST FOOD.

Wash and chop fruits and veggies so they're ready to eat.

## PUT THEM IN SIGHT.

A bowl of fruit on the table is a great reminder to eat fruit.

## DIP IN.

Low-fat Ranch dressing with carrots, yogurt with fruit and peanut butter with apples and celery make great snacks.

## SHOW THEM HOW IT'S DONE.

When parents eat fruits and veggies for snacks and meals, kids will too.

## MORE SIT, LESS FIT.

The more screen time children engage in, the more likely they are to be overweight.

## TURN OFF THE TV TO DEVELOP THE BRAIN.

TV and other interactive media can get in the way of exploring, playing and interacting with others.

## BE CHOOSY.

Pick what shows you're going to watch ahead of time. Don't leave the TV on all day.

## NOT FOR THE LITTLE ONES.

No screen time for children under two. No more than one hour for children 2-5 years old.

## BET YOU CAN STILL KICK THAT CAN.

Teach your children the games you played as a kid.

## IN ANY WEATHER.

Hula hoops, sponge balls and bats, and space for play can keep your family active, rain or shine.

## NO CHILD LEFT INSIDE.

Let children play outside so they can run, jump, skip and be in nature.





## GIFTS THAT KEEP ON GIVING.

Give gifts that promote physical activity.



## CHILDHOOD OBESITY

Prescription for Good Health Pad

<h1>P R E S C R I P T I O N</h1> <h2>F O R   G O O D   H E A L T H</h2>	
PATIENT:	
<div></div>	
DOCTOR:	DATE:
<div></div>	<div></div>
<input type="checkbox"/>  FIVE OR MORE FRUITS & VEGETABLES EVERY DAY	I COMMIT TO: <div></div>
<input type="checkbox"/>  TWO OR LESS HOURS OF SCREEN TIME	
<input type="checkbox"/>  ONE HOUR OR MORE OF PHYSICAL ACTIVITY	
<input type="checkbox"/>  ZERO SUGARY DRINKS	
<h1>5-2-1-0</h1>	